

PATENT COOPERATION TREATY
PCT
INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)
(PCT Article 36 and Rule 70)

REC'D 20 SEP 2005

WIPO

Applicant's or agent's file reference 05240660	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. CT/AU2004/001389	International filing date (day/month/year) 12 October 2004	Priority date (day/month/year) 13 October 2003
International Patent Classification (IPC) or national classification and IPC Int. Cl. ⁷ B29B 17/00		
Applicant CYCLOPLAS HOLDINGS PTY LTD et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 3 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
- a. ☒ (sent to the applicant and to the International Bureau) a total of 3 sheets, as follows:
- ☒ sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
- ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
- b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or table related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items:
- ☒ Box No. I Basis of the report
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

Date of submission of the demand 28 April 2005	Date of completion of the report 8 September 2005
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer M. BREMERS Telephone No. (02) 6283 2052

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/AU2004/001389

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on translations from the original language into the following language which is the language of a translation furnished for the purposes of:

- ☐ international search (under Rules 12.3 and 23.1 (b))
- ☐ publication of the international application (under Rule 12.4)
- ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

☐ the international application as originally filed/furnished

☒ the description:

pages 1-23 as originally filed/furnished

pages* received by this Authority on with the letter of

pages* received by this Authority on with the letter of

☒ the claims:

pages as originally filed/furnished

pages* as amended (together with any statement) under Article 19

pages* 24-26 received by this Authority on 28 April 2005 with the letter of the same

pages* received by this Authority on with the letter of

☒ the drawings:

pages 1 as originally filed/furnished

pages* received by this Authority on with the letter of

pages* received by this Authority on with the letter of

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to the sequence listing (*specify*):

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to the sequence listing (*specify*):

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/AU2004/001389

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Statement

Novelty (N)	Claims 1-28	YES
	Claims	NO
Inventive step (IS)	Claims 1-28	YES
	Claims	NO
Industrial applicability (IA)	Claims 1-28	YES
	Claims	NO

Citations and explanations (Rule 70.7)

The documents cited in the International Search Report disclose the use of water as a susceptor agent. The amended claims are now limited to specific compounds as susceptor agents. Therefore, the claims are novel. Furthermore, it is considered that it would not be obvious to replace water in the prior art with the compounds to which the claims are now limited. Therefore, the claims are inventive.

Claims:

1. A process for recycling plastic material comprising:
reducing a sample of plastic material to form plastic particles having a desired particle size;
- 5 providing a susceptor agent selected from the group consisting of carbon black, hydrocyanic acid, hydrogen peroxide, titanium dioxide, trimethylsulfanilic acid, hydrogen fluoride, formamide, glycerin, acetamide, formic acid, methyl alcohol, p-nitro aniline, dimethyl sulfate, hydrazine, maleic anhydride, titanium oxide, and mixtures thereof to the plastic particles which imparts a dielectric property to the plastic particles;
- 10 providing a bonding agent to the plastic particles; and
treating the plastic particles with microwave energy to form a useable plastic material.
2. The process according to claim 1 further comprising:
forming the plastic material into a solid product.
- 15 3. The process according to claim 1 or 2 wherein the plastic material is mixed or unsorted waste plastic material.
4. The process according to any one of claims 1 to 3 wherein the plastic particles are formed by shredding, granulating, pulverising or grinding.
5. The process according to any one of claims 1 to 4 wherein is less than about 50 mm.
- 20 6. The process according to claim 5 wherein the particle size is 0.5 to 20 mm.
7. The process according to claim 6 wherein the particle size is between about 1 and 5 mm.
8. The process according to any one of claims 1 to 7 wherein the susceptor agent imparts a defined and increased dielectric property to the plastic particles.
- 25 9. The process according to claim 1 wherein the susceptor agent is carbon black.
10. The process according to any one of claims 1 to 9 wherein the susceptor agent is added to the plastic particles in a proportion of between 0.01% to 10% (w/w).
11. The process according to claim 10 wherein the susceptor agent is added at a proportion of between 0.5% to 5% (w/w).
- 30 12. The process according to any one of claims 1 to 11 wherein the bonding agent is a resin formed by dissolving one or more soluble plastics in a solvent.

13. The process according to any one of claims 1 to 11 wherein the bonding agent is formed by adding a soluble plastic to a solvent in a ratio of from 0.75:1 to 2.5:1.
14. The process according to claim 13 wherein the bonding agent is formed by adding a soluble plastic to a solvent in a ratio of about 1:1.
- 5 15. The process according to claim 13 wherein the soluble plastic is polystyrene and the solvent is thinners, toluene or acetone.
16. The process according to claim 13 wherein the soluble plastic is selected from the group consisting of Acetal, Nylon, PEEK, Polystyrene, Polypropylene, Polyvinyl chloride, High density Polyethylene, Polymethyl methacrylate(acrylic) and mixtures
10 thereof.
17. The process according to claim 13 wherein the solvent is selected from the group consisting of m-Chlorobenzene, Cyclohexane, Cyclohexanone, Ethyl chloride, Ethyl ether, Furfuryl alcohol, Isopropyl ether, Ketones, Methyl acetate, Methyl chloride, Methyl ethyl ketone, Methylene chloride, and mixtures thereof.
- 15 18. The process according to any one of claims 1 to 17 wherein the bonding agent is added to the plastic particles in a proportion of between 1% to 30% (w/w).
19. The process according to claim 18 wherein the bonding agent is added to the plastic particles in a proportion of between 5% to 20% (w/w).
20. The process according to claim 19 wherein the bonding agent is added to the plastic
20 particles at about 15% (w/w).
21. The process according to any one of claims 1 to 20 wherein the susceptor agent is provided with the bonding agent.
22. The process according to any one of claims 1 to 21 further comprising a colouring agent or other additive.
- 25 23. The process according to any one of claims 1 to 22 wherein a vacuum is applied during the process.
24. The process according to any one of claims 1 to 23 wherein the plastic particles are heated with microwave energy to a temperature from 120°C to 230°C.
25. The process according to claim 24 wherein the plastic particles are heated with
30 microwave energy to a temperature of at least about 150°C.
26. The process according to any one of claims 1 to 25 wherein the microwave heating is applied while the plastic particles are agitated or mixed.

27. A plastic material produced by the process according to any one of claims 1 to 26.

28. A plastic product produced from the plastic material according to claim 27.